To: 'Daniel Wheeler' [dwheeler@ipns.com]
Cc: Chip Humphrey/R10/USEPA/US@EPA;Kristine Koch/R10/USEPA/US@EPA;Richard Muza/R10/USEPA/US@EPA[]; ristine Koch/R10/USEPA/US@EPA;Richard Muza/R10/USEPA/US@EPA[]; ichard Muza/R10/USEPA/US@EPA[]
From: ANDERSON Jim M
Sent: Thur 5/17/2012 8:26:47 PM
Subject: RE: Bioremediation at Willamette River Superfund sites
Debbie.Deetz.Silva@evrazincna.com
rjw@nwnatural.com
todd.slater@total.com
junderwood@qmg-inc.com
mailto:dwheeler@ipns.com
http://etd.ohiolink.edu/view.cgi?acc_num=ysu1254341459
anderson.jim@deq.state.or.us
dwheeler@ipns.com
dwheeler@ipns.com
jim@forwardsupport.com

Dan,
Thanks for calling me yesterday. I clearly understand you're very knowledgeable & firmly support the use of fungi in remediation of hazardous substances released into the environment. As I hope I adequately explained to you yesterday, DEQ (& I assume EPA) considers remediation using fungi a potentially promising, but "emerging technology". What that means is that we don't have a long track record of use & success in this emerging treatment technology.

From our phone call yesterday, I understood you were asking me to have DEQ perform some type of "feasibility study" on remediation using fungi. I can most definitively tell you that DEQ doesn't have the budget or resources to take on the task of proving a new emerging technology.

Yesterday I told you perhaps you best recourse would be to contact a number of responsible parties (RPs) in the Portland Harbor area & see if they would be interested in remediation using fungi. I told you I'd provide you with some contact information for some of those RPs. Here's that information:

Evratz Oregon Steel Mills- Debbie Silva Deetz

Debbie.Deetz.Silva@evrazincna.com

NW Natural (Gasco site)- Bob Wyatt

rjw@nwnatural.com
3) Arkema- Todd Slater
todd.slater@total.com
4) Rhone Poulenc (SLLI, Bayer Crop Science)- Joan Underwood
junderwood@qmg-inc.com

Jim Anderson
Manager, DEQ Portland Harbor Section
ph: 503.229.6825
fax: 503.229.6899
cell: Personal Privacy / Ex. 6

-----Original Message-----
From: Daniel Wheeler [mailto:dwheeler@ipns.com]
Sent: Wednesday, May 16, 2012 4:34 PM
To: ANDERSON Jim M
Subject: Re: Bioremediation at Willamette River Superfund sites

Thank you for speaking with me, Jim.

Since 1986 I have grown some 60 species of fungi, including chanterelles, morels, and truffles. Some of these fungi have promise for either concentrating or breaking down most toxic wastes found along the lower Willamette River sites, including dioxin, PCBs, PAHs, DDT, lindane, lead, mercury, and cadmium.

I promised to email a citation for the fungus used with contaminated river sediments. Here it is:

http://etd.ohiolink.edu/view.cgi?acc_num=ysu1254341459
Effect of Pleurotus ostreatus on Bioremedition of PAH Contaminated River Sediment by Gacura, Matthew David
Abstract: The purpose of this study was to optimize bioremediation of Mahoning River sediment historically contaminated with polycyclic aromatic hydrocarbons (PAHs) using white rot fungi. Pleurotus ostreatus grown on grain (10% v/v) was added to sawdust (80% v/v), with and without fungal specific nutritional nitrogen (to enhance fungal growth), and with cyclodextrin (to increase PAH availability). Sediment mixtures were incubated in the dark at 25 degrees C for 6 weeks. Sawdust made the sediment more porous, allowed better colonization by fungi, and did not greatly increase volume. Fungal biomass, determined using fluorescent microscopy, indicated initial fungal colonization but then fungal growth was inhibited, likely by toxic metals or high moisture content in the sediment. Growth of unidentified fungi was observed, especially in treatments amended with nitrogen. Total PAH concentrations (in the order of 100 ppm), analyzed using a gas chromatograph mass spectrometer (GCMS), and significantly decreased ~ 50-60% in all treatments, including sediment only controls within the first two weeks. Thus, aerobic degradation by native bacteria and volatilization were likely responsible for most of the observed decreases in PAH concentrations. High heterogeneity of PAHs in this historically contaminated sediment led to high variance between replicates. There was a slight decrease in 5 ring PAHs associated with sediment inoculated with P. ostreatus and also a slight decrease in total PAH concentrations associated with sediment amended with sawdust and cyclodextrin (with or without P. ostreatus. Increased nitrogen did not enhance PAH degradation. Sediment inoculated with P. ostreatus after two weeks, rather than initially, showed better fungal growth and colonization, but PAH data was not yet available. These data indicate there is great potential for bioremediation of PAH contamianted sediment conditions by stimulating indigenous bacteria under aerobic conditions followed by the addition of white rot fungi. However, further testing and optimization is still required.

I find the above citation questionable. Growing a fungus in a breeder reactor has inherent problems. Not the least of which is the possible growing of anthrax or toxic viral substance. In nature, P. ostreatus does not grow in water, and typically grows exclusively on either cellulose, hemicellulose or lignin.

Paul Stamets wrote in "Growing Gourmet and Medicinal Mushrooms" that "In heavily industrialized areas, soils are often contaminated with a wide variety of pollutants, particularly petroleum-based compounds, polychlorinated biphenols (PCB's), heavy metals, pesticide-related compounds, and even radioactive wastes. Mushrooms grown in polluted environments can absorb toxins directly into their tissues. As a result, mushrooms grown in these environments should not be eaten. Recently, a visitor to Ternobyl, a city about 60 miles from Chernobyl, the site of the world's worst nuclear power plant accident, returned to the United States with a jar of pickled mushrooms. The mushrooms were radioactive enough to set off Geiger counter alarms as the baggage was being processed."

I have grown the mushroom mentioned above. The radioactive element was Cesium-137. I'm no longer interested in eating it.<G>

> Here is Jim Anderson's email address: anderson.jim@deq.state.or.us

>
>
> On Fri, May 11, 2012 at 3:42 PM, Daniel Wheeler <dwheeler@ipns.com> wrote:
>
>> I have emailed Chip, but have not heard back from him. Apparently the
>> US EPA knows almost nothing about the organisms I grow.
>>
>> I have not spoken to Jim Anderson at Oregon DEQ. I will email him
>> shortly (if you send his email address)?
>>
>> It seems very short-sighted that after $96 million worth of "studying
>> the problem", I can find no documents that the US EPA has worked with
>> these organisms at all. Well, one: most people have never heard of
>> them nor tried to grow them.
>> > Have you spoke with Jim Anderson at Oregon DEQ or Chip Humphreys at
>> > US EPA? They would be most able to direct you to who has active
>> > remediation.
>> >
>> > I would like to also have you speak with our technical consultant,
>> Peter
>> > deFur.
>> >
>> > Most of the sites on the Portland Harbor are not yet looking for
>> > contractors, since the EPA first needs to issue the Order for the
>> cleanup.
>> > I think it would be good to talk with Chip Humphreys.
>> >
>> > I can send more info when back at my computer.
>> >
>> > Jim
>> > Sent from my BlackBerry® smartphone, powered by CREDO Mobile.
>> >
>> > -----Original Message-----
>> > From: "Daniel Wheeler" <dwheeler@ipns.com>
>> > Date: Fri, 11 May 2012 16:19:11
>> > To: <jim@forwardsupport.com>
>> > Subject: Bioremediation at Willamette River Superfund sites
>> >
>> > Hello!
>> >
>> > I received your email address from Rep. Earl Blumenauer's office.
>> > He suggested I contact you regarding my skills at growing organisms
>> > which eat toxic waste and are part of the Lower Willamette River's
>> > ecosystem.
>> >
>> > One organism in particular is native to the lower Willamette River
>> > (Sauvies Island) which eat and degrade many of the toxic chemicals
>> named
>> > in the Superfund, including dioxin, PCBs, DDT, lindane, creosote,
>> dioxin,
>> > as well as many other things which are not good to have in our
>> > rivers, such as fecal coloform bacteria (sewage overflow).
>> >

>> > I would like to begin growing this organism on some of the
>> > Superfund sites to assess the long-term remediation of many of
>> > these problems. I anticipate this process to take at minimum 10
>> > years. To date I have
>> been
>> > unable to find specific contact people who have signed the
>> > agreement
>> with
>> > the EPA saying they are liable for the cleanup.
>> >
>> > My cultivation method requires capping bare contaminated soils with
>> 2-4
>> > inches of a biological element: basically compost. The organisms I
>> grow
>> > would use this as their food supply. The compost should last up to
>> > 2 years, for long-term action on many toxic waste sites. As it
>> > eats through the compost, it also searches out additional food
>> > supplies for up to 4 inches into the soil. This biological material
>> > is the same as that currently found along all stretches of the
>> > Willamette River and often
>> is
>> > swept into the river. There should be no problem composting this
>> organism
>> > down to the water line, and it is harmful only to nematodes that I
>> know
>> > of. (It eats nematodes as a source of nitrogen.)
>> >
>> > The organism is a natural part of the ecosystem and normally would
>> > be found along the Willamette River, if it had not already been
>> "developed"
>> > (I would describe it as "degraded") for commercial purposes. The
>> organism
>> > is non-toxic, can be found in many Portland-area grocery stores, is
>> > edible for many people.
>> >
>> > Not all toxic compounds can be treated with this organism. But I
>> > have grown similar organisms over the past 25 years which are also
>> > native
>> to
>> > the West Coast of the United States, and are capable of eating
>> creosote,
>> > concentrating lead, mercury, cadmium and some other heavy metals;
>> > as
>> well
>> > as promoting a healthy recolonization of native vegetation along
>> > the Willamette River. While the compost will kill off certain
>> > forbes and grasses, it should have no effect on healthy shrubs or
>> > trees in the
>> area.
>> >
>> > I am specifically interested in individual Superfund companies
>> > which would like to begin bioremediation efforts on lands they are
>> > legally liable for.

>> > The sooner I get test plots established, the sooner we can get this
>> > behind us. My proposed plans require no earth moving, but may
>> > require recirculation contaminated water over the compost beds for
>> > bioremediation.
>> > The first organisms seems to pave the way for successive organism
>> > treatments, and has already been shown to "eat" dioxin, some
>> > furans,
>> PCP,
>> > DDT, PAHs, and PCBs.
>> >
>> > The one thing which has already been done to several "clean-up
>> > sites", which would have to be undone, is the euphamistic "capping"
>> > already
>> done
>> > (and proposed extended by current suggested "clean-up" plans) by
>> > the
>> EPA
>> > of impermeable asphalt over several acres of land. Without having
>> > the contaminated sites in direct contact with the compost and
>> > organisms I have grown, these toxins CANNOT be degraded.
>> >
>> > I apologize for not naming the organisms I grow. Once commonly
>> > known, there will be considerable competition for using them at
>> > Superfund
>> sites
>> > around the world. I want to have a couple of long-term contracts
>> before I
>> > release that information.
>> >
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